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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/072,813	02/08/2002	David P. Wilkinson	130109.447C1	3578

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EXAMINER	
CREPEAU, JONATHAN	
ART UNIT	**PAPER NUMBER**
1746	

DATE MAILED: 06/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/072,813	WILKINSON ET AL.	
	Examiner	Art Unit	
	Jonathan S. Crepeau	1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 June 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,8-10 and 20-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *20,21 and 28* is/are allowed.

6)☒ Claim(s) *1,8 and 22-27* is/are rejected.

7)☒ Claim(s) *9 and 10* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6/6/02, 6/27/02*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over under GB 2316802 in view of Hamada et al (U.S. Patent 5,958,613).

On page 3, GB '802 teaches a fuel cell with separator plates, electrodes, and an electrolyte membrane. An electrode has a structure wherein the porosity decreases in a flow direction (see abstract). Thus, regarding claim 8, the density would increase in the flow direction. Regarding claim 1, both the anode and cathode having the disclosed structure can be immediately envisaged by a skilled artisan, thus, the reference is anticipatory of the limitation that the electrode is a cathode.

GB '802 does not expressly teach that the oxidant flow path extends "substantially linearly" across the surface of the cathode.

In Figure 3 and in column 4, lines 35-46, Hamada et al. teach a PEM fuel cell with substantially linear cathode and anode flow channels.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because as exemplified by the disclosure of Hamada et

al., linear flow channels are well-known in the art. Since these flow channels offer advantages such as a low pressure drop and relative ease of construction, the artisan would therefore possess sufficient skill to use them in the fuel cell of GB '802. Accordingly, this limitation is not considered to distinguish over the references.

3. Claims 1, 22, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over under WO 97/08766 in view of Hamada et al.

In claim 1, WO '766 discloses a fuel cell assembly comprising first and second separator plates, a membrane electrode assembly, cathodes and anodes comprising substrates with electrocatalysts disposed thereon, a reactant flow path extending across the electrochemically active area of at least one electrode for directing a fluid stream between inlet and outlet ports, and an in-plane nonuniform structure on the electrode for imparting uneven fluid transport properties as the active area is traversed in the direction of the flow path (also see Figs. 5-8, 14A, and 14B). As shown in Figures 5-7, the structure of the electrode may vary symmetrically as the active area is traversed. As shown in Figure 7, the material composition of the substrate may also vary symmetrically. Regarding claim 1, the substrate is a cathode substrate (see page 17, line 27).

WO '766 does not expressly teach that the oxidant flow path extends "substantially linearly" across the surface of the cathode.

In Figure 3 and in column 4, lines 35-46, Hamada et al. teach a PEM fuel cell with substantially linear cathode and anode flow channels.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because as exemplified by the disclosure of Hamada et al., linear flow channels are well-known in the art. Since these flow channels offer advantages such as a low pressure drop and relative ease of construction, the artisan would therefore possess sufficient skill to use them in the fuel cell of WO '766. Accordingly, this limitation is not considered to distinguish over the references.

4. Claim 25, 26, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO '766 as applied to claims 1, 22, 23, and 24 above, and further in view of Frost et al (U.S. Patent 5,702,839).

WO '766 does not expressly teach that the substrate comprises a coating having a varying loading (claim 25) or varying composition (claim 26) is located on the surface of the substrate.

Frost et al. teaches an electrode having a non-uniform structure (see abstract). In column 6, line 62 et seq., the reference teaches that the electrode substrate comprises a coating which has a varying composition (e.g., a polymeric composition). Furthermore, the coating may have a varying loading (see col. 7, line 27).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to apply the nonuniform coating layer of Frost et al. on the electrode substrate of WO '766. In column 6, line 66 Frost et al. teach that "the component whose amount varies in the non-uniform layers [is] chosen to promote enhanced electrochemical performance." As such, the artisan would be motivated to apply the nonuniform coating layer of Frost et al. on the electrode substrate of WO '766.

Double Patenting

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 1 and 22-24 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 20-41 of copending Application No. 10/079,612. Although the conflicting claims are not identical, they are not

patentably distinct from each other because the claims of the '813 application anticipate the instant claims. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

7. Claim 1 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-35 of U.S. Patent No. 5,840,438 in view of Hamada et al. The '438 patent claims does not expressly recite that the oxidant flow path extends "substantially linearly" across the surface of the cathode; however, in Figure 3 and in column 4, lines 35-46, Hamada et al. teach a PEM fuel cell with substantially linear cathode and anode flow channels. Therefore, instant claim 1 is an obvious variation of the '438 patent claims because as exemplified by the disclosure of Hamada et al., linear flow channels are well-known in the art. Since these flow channels offer advantages such as a low pressure drop and relative ease of construction, the artisan would therefore possess sufficient skill to use them in the system defined by the '438 patent claims.

Allowable Subject Matter

8. Claims 20, 21, and 28 are allowed.

9. Claims 9, and 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

Independent claim 20 recites, among other features, that the material composition of the electrocatalyst varies as the electrode is traversed in-plane. Frost et al., the closest prior art, teaches that the electrocatalyst loading is varied along the length of the electrode, but does not fairly suggest that the electrocatalyst composition is varied in this manner.

Independent claim 28 recites, among other features, that the loading the electrocatalyst of varies "substantially symmetrically" as the active area is traversed in-plane in the direction of the reactant flow path. Frost et al., the closest prior art, discloses a loading "pattern" but does not fairly suggest a "substantially symmetrical" configuration.

Dependent claims 9 and 10 recite that the porosity and pore size of the cathode substrate increase as the substrate is traversed in-plane in the direction of the reactant flow path. GB 2316802, the closest prior art, teaches that the porosity decreases as the substrate is traversed. As such, the reference does not fairly suggest the claimed increase in porosity and pore size.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (571) 272-1302. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jonathan Crepeau
Patent Examiner
Art Unit 1746
June 9, 2004